PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

A Method of Reducing Cross-talking in Telephone Cables.

We, FELTEN & GUILLEAUME CARLSWERK ACTIEN-GESELLSCHAFT, of Köln-Mülheim, Germany, a German company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a method of reducing cross-talking in telephone cables.

In order to reduce cross-talking in telephone cables, more particularly in double telephone circuits (phantoms) it has been proposed to balance the inequalities of the capacities between the conductors, hereinafter referred to as "part capacities," which inequalities are the cause of cross-talking, two methods having become known in connection therewith. According to one method the conductors of the individual sections of the lines are crossed at the junction points in such a manner that the inequalities of the capacities of the successive sections are mutually compensated, whilst according to the other method, so-called balancing condensers are added to the lines, by means of which the part capacities which are too small are increased and made equal to the highest part capacities. These methods have certain great disadvantages. Thus, in the case of the first method. the installing of the cable is complicated, the crossings produce irregularities in the sequence of the conductors, which irregularities are a handicap, more especially in the case of repairs. and further, when individual sections are replaced by new sections, it is necessary to effect an entirely new balance. The disadvantages of the second method are: The increase in the cost of the installation caused by the use and mounting of the condensers and the difficulty of maintaining the electric properties of the latter permanently constant.

The object of the present invention is to provide a new balancing method which is free from the disadvantages above referred to. The invention makes use of the fact that the differences between the values of the part capacities produced during the manufacture of the cables intended for phantom circuits are small as compared with the actual capacities of the lengths of manufacture, so that it is possible, by effecting the required alterations in the capacities of the said lengths, in a portion thereof which is short as compared with the whole length, to balance the inequalities for the whole length of manufacture.

According to the present invention the required alterations in the capacities of the sections are effected by altering the dielectric conditions between the conductors of the balancing portion. This may be effected, according to the invention, either by covering with a common band of electrically conducting material, such as tin-foil, each two conductors of the twisted phantom, the capacity between which conductors is to be altered, whereby the capacity of the length is increased, or by reducing the distance between the two conductors by a common binding round the conductors, or by increasing the said distance by insertions between the conductors, the capacity of the length being increased in the first case and reduced in the second case. In this way, alterations may be effected in the part capacities of a normal paper insulated telephone cable over a length of a few metres, which capacity alterations may amount to a few hundred centimetres and are thus sufficient for

having an influence upon one another are compensated by correspondingly balancing the part capacities in a short portion of the length by altering the dielectric conditions between the conductors.

2. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is increased by binding them together with a common band of electrically conducting material, such as tinfoil.

3. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is increased by pressing them against one another by means of a common binding.

4. A method as claimed in Claim 1, consisting in this that the part capacity between two conductors of the balancing portion is reduced by moving them away from each other by means of insertions.

5. A method of balancing part capacities in the cable sections of telephone cables more particularly those having double telephone circuits (phantoms) consisting in this that instead of using ordinary junction sleeves, use is made of balancing sleeves in each cable section, according to requirements, which sleeves accommodate a portion of the cable, which serves as the short balancing piece referred to in Claim 1, and the part capacities of which are balanced as claimed in Claim 2, 3 or 4.

6. A method as claimed in Claim 5, consisting in this that the portion of the cable is subdivided in the balancing sleeves into a plurality of cables comprising a corresponding smaller number of phantoms.

7. The improved method of reducing cross-talking in telephone cables, substantially as described.

Dated this 3rd day of April, 1924.

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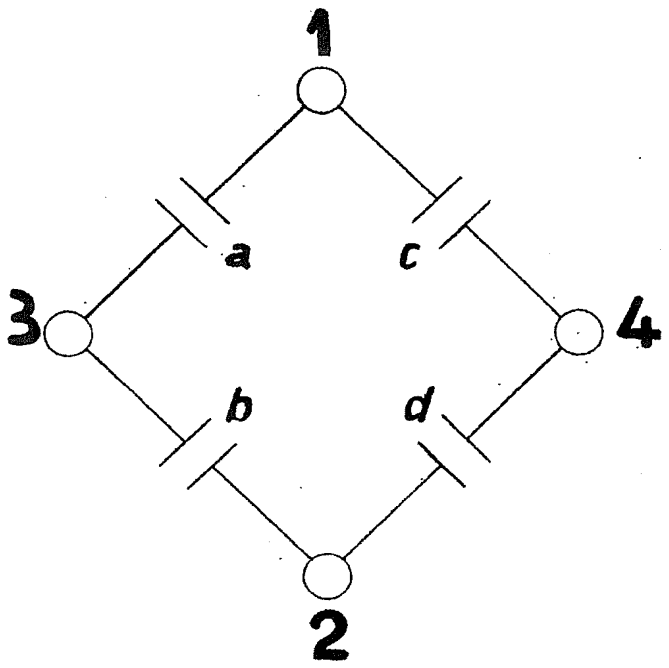

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